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Aquathermolysis of crude oils and natural bitumen: Chemistry, catalysts and prospects for industrial implementation

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Abstract

© 2015 Russian Academy of Sciences and Turpion Ltd. The results of studies of alterations in the elemental and SARA compositions and physicochemical and rheological properties of highly viscous heavy crude oils upon catalytic and non-catalytic aquathermolysis are generalized. The chemistry of transformations of model hydrocarbons and heteroatomic compounds in aqueous media at high temperature, including subcritical and supercritical conditions, is considered. Comparative analysis of methods for activation of oil conversion via aquathermolysis using hydrogen donors, oil-soluble and water-soluble nanodispersed catalysts, ionic hydrogenation processes and various ways for reservoir heating is presented. Problems and prospects of oil-field implementation of catalytic aquathermolysis for upgrading heavy oils and natural bitumen are discussed.

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